# **ENVIRONMENTAL PRODUCT DECLARATION**

as per /ISO 14025/ and /EN 15804/

Owner of the Declaration	IGI - The Global Wallcoverings Association
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-IGI-20170144-IBG1-EN
ECO EPD Ref. No.	ECO-00000623
Issue date	11/12/2017
Valid to	10/12/2023

# Vinyl wallcoverings on woven textile backing

# IGI - The Global Wallcoverings Association



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# . General Information

IBU - Institut Bauen und Umwelt e.V. Panoramastr. 1 10178 Berlin Germany Declaration number EPD-IGI-20170144-IBG1-EN This Declaration is based on the Product Category Rules: Wall coverings, 09.2016 (PCR tested and approved by the SVR) Issue date 11/12/2017 Valid to 10/12/2022	members of the IGI - The Global Wallcoverings Association. Non-decorative wallcoverings for a later additional treatment like painting ("whites") are included in this
Panoramastr. 1 10178 Berlin Germany Declaration number EPD-IGI-20170144-IBG1-EN This Declaration is based on the Product Category Rules: Wall coverings, 09.2016 (PCR tested and approved by the SVR) Issue date 11/12/2017 Valid to 10/12/2022	Chaussée de Louvain 426 1380 LASNE - Belgium <b>Declared product / Declared unit</b> The declared unit is 1m² (square metre) decorative vinyl based wallcovering on woven textile backing including packaging. <b>Scope:</b> This EPD focusses on the production, transport and disposal of a weighted average of 1m² vinyl wallcoverings on woven textile backing of participating members of the IGI - The Global Wallcoverings Association. Non-decorative wallcoverings for a later additional treatment like painting ("whites") are included in this
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Valid to	Non-decorative wallcoverings for a later additional treatment like painting ("whites") are included in this
Valid to	treatment like painting ("whites") are included in this
10/12/2022	scope as they follow a worst case approach.
	9 out of 67 IGI-members are involved in this EPD. Th EPD is valid only for those companies.
	The technical properties are displayed in chapter 2.3.
	The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall no be liable with respect to manufacturer information, life cycle assessment data and evidences.
	Verification
Wiemanes	The CEN Norm /EN 15804/ serves as the core PCF
o vermanes	Independent verification of the declaration
	according to /ISO 14025/
Prof. DrIng. Horst J. Bossenmayer (President of Institut Bauen und Umwelt e.V.)	internally x externally
Ledmann	frall
	Prof. Dr. Birgit Grahl
(Managing Director IBU)	(Independent verifier appointed by SVR)

# 2.1 Product description / Product definition

Vinyl based wallcovering on textile backing is a wallcovering according to /EN 15102/ using a woven textile base. The textile base (scrim) can be cotton or a polyester-cotton blend. When the wallcovering is to be changed it can be stripped in its entirety by peeling the wallcovering lengths from the wall. This property as defined in /EN 235/ is strippable.

For the placing on the market of the product in the EU/EFTA (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies. The product needs a Declaration of Performance taking into consideration /EN 15102/ and CE-marking. For the application and use the respective national provisions apply.

For the placing on the market in the USA the product should conform to /ASTM F 1141 – 93/ Standard Specification for Wallcovering and /ASTM F 793 – 06/ Standard Classification of Wall Covering by Use Characteristics. Or:

Wallcoverings Association /WA-101/ Quality Standard for Polymer coated Fabric Wallcovering.



# 2.2 Application

Wallcoverings are used for the decorative wall design of interior spaces in private or commercial use.

# 2.3 Technical Data

# **Constructional data**

In accordance with /EN 233/, the following technical (structural) data can be declared on delivery:\*

Name	Value	Unit
Measures by categories /EN 233/	category 1 - 3	-
Straightness and parallelism according to /DIN EN 12956/	< 1	-
Washability according to /EN 12956/	extra- scrubbable	-
Colour fastness to light according to /EN ISO 105-B02/	6	-
Migration of heavy metals and certain other elements to /EN 12149/	fulfills the norm	-
Vinyl chloride monomer (VCM) content max. < 0,2 mg/m² according to /EN 12149/	fulfills the norm	-
Emissions of formaldehyde max. < 120 mg/kg according to /EN 12149/	fulfills the norm	-

In case of multiple answers, values need to be examined depending on the manufacturer.

For USA manufactured products should be in accordance with /ASTM F 793-0-06/ Table 1 Classification Criteria.

Or:

/Wallcoverings Association WA-101/ Table 1 Physical Test Requirements.

Depending on whether products are intended for the European or US market, the following performance data must be declared.

# 1a: Product according to the /CPR/, based on /EN 15102/:

Performance data of the product in accordance with the Declaration of Performance with respect to its Essential Characteristics according to /EN 15102/

# or:

# 1b

Performance Category I, II, III, IV, V or VI as described in Table 1 of /F 793-0-06/ should be declared.

Compliance with Wallcoverings Association /WA-101/ Type I, II or III should be declared.

# 2.4 Delivery status

The products declared are provided within the following dimensions:

Width	metres	Length	metres
Min.	Max.	Min.	Max.
0.14	1.50	1.00	150.00

This table contains the range of all wallcoverings examined. For more precise information please contact the specific manufacturer.

# 2.5 Base materials / Ancillary materials

The weighted average of the primary product components is shown in the following table, in percentage:

Name	Value	Unit
Cotton	6	%
PET	2	%
PVC Plastisol	53	%
Ink	5	%
Chemicals and auxiliary materials	16	%
Packaging	18	%
Sum	100	%

Pallets were considered as part of the packaging.

It cannot be ruled out that individual wallcoverings may contain small amounts of substances that are included in the SVHC candidate list. This can be attributed, for example, to the contents of used waste paper.

Depending on the manufacturer and wallcoverings, different flame retardants, biocides and plasticizers can be used.

Further information can be obtained from the respective manufacturer.

# 2.6 Manufacture

The manufacturing process can be described with the help of the following graphic:



The order of manufacture may change and can slightly deviate for different producers.

# 2.7 Environment and health during manufacturing

Compliance with statutory health and safety for personnel is ensured. Further,

the energy and environmental management is certified for some members according to /ISO 14001/ and /ISO 50001/.

For greater detail please contact the specific Manufacturer.

# 2.8 Product processing/Installation

Depending on the manufacturers suggestion, the adhesive is applied to the back of the wallcovering or the substrate using a wallpaper brush or short-napped roller. The wallcovering is pressed against the wall and is cut along the top and bottom edge to fit the wall.

# 2.9 Packaging

Product is wrapped in polyolefin film, packed in corrugated cardboard boxes and palletised.

# 2.10 Condition of use

There are no special features to be noted within the limits of normal and customary usage.



# 2.11 Environment and health during use

No environmental problems can be expected when the product is handled and used properly.

# 2.12 Reference service life

Given the wallcovering is professionally installed, the reference service life is 15 years according to experience values.

# 2.13 Extraordinary effects

# Fire

The fire performance according to /EN 13501/ is shown in the following table:\*

#### **Fire protection**

Name	Value
Building material class	B-D
Burning droplets	s1-s3
Smoke gas development	d0-d2

\*This table contains the range of all wallcoverings

examined. For more precise information please contact the specific manufacturer.

For USA information on fire performance according to /ASTM E 84/ Test method for Surface Burning Characteristics of Building Materials.

# 3. LCA: Calculation rules

# 3.1 Declared Unit

The declared unit is 1 m<sup>2</sup> of wallcovering including packaging. The model shows a weighted average based on data (including produced square metres) from the participating manufacturers.

#### **Declared unit**

Name	Value	Unit
Declared unit	1	m <sup>2</sup>
Grammage	0.493	kg/m²
Conversion factor to 1 kg	0.493	-

# 3.2 System boundary

Type of the EPD: cradle to gate - with option. The EPD is considered as a declaration of an average product as calculated from the output of several manufacturers (2b).

#### Module A1-3, A4 and A5

The product stage begins with the consideration of the production of the necessary raw materials and energies including all corresponding upstream processes as well as transport. Furthermore, the entire production phase was investigated, including the treatment of production waste until reaching the end-of-waste status (EoW). In addition, distribution transport and installation in the building were taken into account.

# Module C2-4

The modules include the environmental impacts of the waste treatment until reaching the end-of-waste status (EoW) including the associated transport at the end of the product life cycle.

#### Water

Product is not water resistant. There is no risk of a hazardous environmental impact in the event of water flooding.

#### Mechanical destruction

There is no risk of a hazardous environmental impact following unforeseen mechanical destruction.

#### 2.14 Re-use phase

Product is not re-usable.

### 2.15 Disposal

Wallcoverings are subject to the waste code 170904 (mixed construction and demolition waste other than those mentioned in 170901, 170902 and 170903) in accordance with the /European Waste Catalogue/ (/EWC/).

Wallcoverings can therefore be disposed of as normal household waste, that is in the dustbin or in additional refuse sacks. Used wallcoverings should not be placed in the waste paper bank. Most household waste is incinerated or landfilled depending on regional legal regulations in the EU or in the US.

### 2.16 Further information

For further information please visit www.igiwallcoverings.org.

# Module D

Calculation of potential benefits through the generated energy (electric & thermic) by the incineration processes in the life cycle stages in A5 C3 and C4. The burdens resulting from the waste-to-energy plants are assigned in module C3 or C4 in case of landfill gas combustion.

#### 3.3 Estimates and assumptions

Most solvents were modelled as a generic mix of solvents.

Even though this EPD is also valid for 'whites', they are not part of the average which is responsible for the results in chapter 5. 'Whites' are not decorative wallcoverings yet, because there is a final production step (e.g. painting) missing.

As a result, 'whites' have less environmental Impact than comparable decorative wallcoverings with similar weights.

#### 3.4 Cut-off criteria

Some materials that contributes less than 0,2% to the total weight of the average wallcovering were cut off. This is about 1% of the total Input mass. No energy consumption was neglected.

# 3.5 Background data

For modeling the lifecycle, the software system for holistic balancing /GaBi/ was used. All background data records relevant for production and disposal were almost exclusively taken from various GaBi supplementary databases. Rarely, the /ecoinvent/ (v.2.2) database were taken. The data records included in the databases are documented online.



# 3.6 Data quality

Data collection for the investigated products was carried out on the basis of evaluations of the internal production and environmental data, the collection of LCA-relevant data within the supply chain as well as through the measurement of relevant energy supply data. The collected data were checked for plausibility and consistency. A good representation is to be assumed.

The data were collected in 2016 and refer to the calendar year 2015.

### 3.7 Period under review

The LCA data were collected for the calendar year 2015.

# 3.8 Allocation

Potential benefits resulting from the thermal utilization of the packaging waste (module A5) as well as from the energetic utilization of the wallcoverings at the end of life (module C3) are allocated to module D.

### 3.9 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to /EN 15804/ and the building context, respectively the product-specific characteristics of performance, are taken into account.

# 4. LCA: Scenarios and additional technical information

### Transport to the building site (A4)

Name	Value	Unit					
Truck transport	27	t payload					
Transport distance	445	km					
Train transport	726	t payload					
Transport distance	7	km					
Ship transport	27500	dwt payload					
Transport distance	261	km					
Cargo plane transport	65	t payload					
Transport distance	47	km					
Capacity utilisation (including empty runs)	80 - 90	%					

Because many different countries are involved, there were always global data sets used to model the transport distances.

# Reference service life

Name	Value	Unit
Reference service life	15	а

#### End of life (C1-C4)

Name	Value	Unit
Energy recovery	3	%
Landfilling	97	%
	10.00	

For the calculation of this LCA landfilling is chosen for the US and incineration for the EU. Different disposal routes are available but not taken into account for this industry average LCA.

# Reuse, recovery and/or recycling potentials (D), relevant scenario information

In module D the potential benefits of the thermal combustion from the wallcoverings (C3), their packaging (A5) as well as the incineration of landfill gases (C4) are displayed.



# 5. LCA: Results

In this section, the LCA results for 1 m<sup>2</sup> wallcoverings are presented. It should be borne in mind that the LCA results only indicate possible effects.

### Indicators used for evaluation:

The CML (Centrum voor Milieukunde) methodology with the characterization factors in version 2001 - April 2013 is used to evaluate the possible environmental effects of the wallcoverings. The following impact categories are evaluated:

Global warming potential (**GWP**), Degradation potential of the stratospheric ozone layer (**ODP**), Acidification potential of soil and water (**AP**), Eutrophication potential (**EP**), Photochemical ozone creation potential (**POCP**), Potential for abiotic degradation of non-fossil resources (**ADPE**), Potential for abiotic degradation of fossil fuels (**ADPF**)

The fresh water consumption corresponds to the "Blue Water" consumption according to "The Water Footprint Assessment Manual, 2011".

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A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	Х	X	X	Х	MND	MND	MNR	MNR	MNR	MND	MND	MND	Х	X	Х	x	
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EP		0 <sub>4</sub> ) <sup>3</sup> -Eq.]		8E-4		91E-5		1.90E-5		4.35E-6		9.16E-7		1.17E		-1.54E-6	
POCP		ene-Eq.]		5E-4		59E-6		6.07E-6		-7.56E-6		3.71E-7		2.03E		-1.23E-6	
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PERI PERI PERI PENR PENR PENR SM	E [ M [ T [ RE [ RE [ RT [	MJ] MJ] MJ] MJ] MJ] MJ] [kg]	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E	<b>3</b> +0 +0 +0 +1 +1 +1 +1 -2	1.27 0.00 1.27 1.32 0.00 1.32 0.00	V4 7E-2 DE+0 7E-2 2E+0 DE+0 2E+0 DE+0	6. -6 6. 2. -2. -2. 8. 0.	A5 41E-1 .35E-1 02E-3 18E+0 10E+0 31E-2 00E+0		C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 3.87E-2 0.00E+0	igs on	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 1.97E-2 0.00E+0		C4 5.27E -4.99E 2.78E 1.29E -1.25E 3.75E 0.00E	-1 -1 -2 +1 +1 -1 +0	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0	
PERI PERI PERI PENR PENR PENR	E [ M [ T [ RE [ M [ RT [	MJ] [ MJ] [ MJ] [ MJ] [ MJ] [ MJ] [	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E	<b>3</b> +0 +0 +1 +1 +1 +1 +1 +1 -2 +0 +0 +0	A 1.27 0.00 1.27 1.32 0.00 1.32 0.00 0.00 0.00	V4 7E-2 0E+0 7E-2 2E+0 0E+0 2E+0	6. -6 6. 2. -2. -2. 8. 0.0	A5 41E-1 .35E-1 02E-3 18E+0 10E+0 31E-2		C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 3.87E-2 0.00E+0 0.00E+0 0.00E+0	igs on	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 1.97E-2		C4 5.27E -4.99E 2.78E 1.29E -1.25E 3.75E	-1 -1 -2 +1 +1 +1 -1 +0 +0 +0	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1	
PERI PERI PERI PENR PENR PENR SM RSF	E [ M [ T [ RE [ RE [ RT [ F [	MJ] MJ] MJ] MJ] MJ] MJ] MJ] MJ]	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E 5.63E	3           +0           +0           +0           +1           +1           +1           +1           +1           +1           +1           +1           +1           +1           +1           +2	A 1.27 0.000 1.27 1.32 0.000 1.32 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.000000 0.0000 0.0000000 0.0000 0.00000000	A 7E-2 7E-2 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+	6 6. 2. -2. 8. 0.1 0.1 0.1 1.	A5 41E-1 .35E-1 02E-3 18E+0 10E+0 31E-2 00E+0 00E+0 00E+0 00E+0 47E-5		C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 3.68E-6		C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 1.97E-2 0.00E+0 0.00E+0 0.00E+0 4.65E-5		C4 5.27E -4.99E 2.78E 1.29E -1.25E 3.75E 0.00E 0.00E 0.00E 8.99E	-1 -1 -2 +1 +1 +1 -1 +0 +0 +0 -6	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 -4.32E-5	
PERI PERI PENR PENR PENR SM RSF NRSI FW	E [ M [ T [ RE [ RE [ RT ] F [ F ] renee of se	MJ] MJ] MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable p ccondary	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E 5.63E Jse of re imary en wable pri rimary er material	3 +0 +0 +0 +1 +1 +1 +1 +1 +0 +0 -2 -2 mary en ergy res imary en ergy res	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 12E+0 7E-2 2E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 12E+0 1	6. -6 6. 2. -2. -2. 8. 0.1 0.1 0.1 1. excludir raw mat pon-rene raw mat le secor	A5 41E-1 35E-1 02E-3 10E+0 10E+0 31E-2 00E+0 00E+0 47E-5 ng renew erials; P wable p terials; P mdary fue	able pri ERT = T imary e ENRT = ls; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 1.00E+0 0.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0urces us wable prin used as n-renewal	sed as i mary er raw ma ble prin	C4 5.27E 4.99E 2.78E 1.29E -1.25E 3.75E 0.00E 0.00E 0.00E 0.00E 8.99E aw mate bergy res terials; P nary ene	-1 -1 -2 +1 +1 +1 +0 +0 -6 -6 -6 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0	
PERI PERI PERI PENR PENR SM RSF NRSI FW Caption	E [ M ] T ] E [ M ] RT ] F [ F ] F ] P renew n rene of se	MJ MJ MJ MJ MJ MJ MJ MJ MJ MJ	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 5.63E Use of re imary en wable priv	3           +0           +0           +0           +1           +1           +1           +1           +2           +0           -2           +0           -2           imary energy resimary energy resimary energy results           1; RSF =           \Left - OU	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 2.44 e primary sources to hergy exis sources to tuse of the <b>TPUT</b>	4 7E-2 DE+0 7E-2 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0	6. -6 -6 -2. -2. -2. -2. -2. -2. -2. -2. -2. -2.	A5 41E-1 .35E-1 02E-3 02E-3 10E+0 .10E+0 .31E-2 00E+0 00E+0 00E+0 47E-5 g renew erials; P ewable p terials; P terials; P terials; P terials; P	able pri ERT = T imary e ENRT = ls; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 1.00E+0 0.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0urces us wable prin used as n-renewal	sed as i mary er raw ma ble prin	C4 5.27E 4.99E 2.78E 1.29E -1.25E 3.75E 0.00E 0.00E 0.00E 0.00E 8.99E aw mate bergy res terials; P nary ene	-1 -1 -2 +1 +1 +1 +0 +0 -6 -6 -6 -6 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PUse of non- urces; SM = Use	
PERI PERI PERI PENR PENR SM RSF NRSI FW Caption	E [ M [ T ] RE [ RM ] RT ] F ] F ] F ] F ] F ] N rene of se ULTS invl v	MJ MJ MJ MJ MJ MJ MJ MJ MJ MJ	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E 5.63E Jse of re imary en wable pri rimary en r material	3 +0 +0 +0 +1 +1 +1 +1 +1 +1 +1 +1 +1 +1 +1 +1 +1	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 DE+0 7E-2 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0	6. -6 -6 -2. -2. -2. -2. -2. -2. -2. -2. -2. -2.	A5 41E-1 .35E-1 02E-3 02E-3 10E+0 .10E+0 .31E-2 00E+0 00E+0 00E+0 47E-5 g renew erials; P ewable p terials; P terials; P terials; P terials; P	able pri ERT = T imary e ENRT = ls; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 1.00E+0 0.00E+0 1.00E+0 1.00E+0 1.00E+0 1.00E+0 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3 1.09E-3	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0urces us wable prin used as n-renewal	sed as i mary er raw ma ble prin	C4 5.27E 4.99E 2.78E 1.29E -1.25E 3.75E 0.00E 0.00E 0.00E 0.00E 8.99E aw mate bergy res terials; P nary ene	-1 -1 -2 +1 +1 +1 +0 +0 -6 -6 -6 -6 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7 -7	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PUse of non- urces; SM = Use	
PERI PERI PERI PENR PENR SIM SIM SIM Caption Caption 1m <sup>2</sup> v	E [ M [ T [ RE [ RE ] RT ] F [ F ] F [ renew n rene of se ULTS inyl v	MJ MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable pr on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene o	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 5.63E Jse of re imary en wable pririmary en r material	3 +0 +0 +1 +1 +1 +1 +1 +1 +1 -2 +0 +0 +0 -2 -2 imary er bergy res imary er bergy res imary er bergy res is on v 3	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 7E-2 7E-2 7E-2 7E+0 7E+0 7E+0 7E+0 7E+0 7E+0 7E+0 7E+0	6. 6. 2. 2. 2. 3. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.	A5 41E-1 .35E-1 02E-3 18E+0 31E-2 00E+0 00E+0 00E+0 47E-5 mg renew erials; P ewable p terials; P dary fue D WAS ing	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 3.68E-6 mary en- otal use r Use r ATEG	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 1.97E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 ources us wable prin used as n-renewal	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E 1.29E 3.75E 0.00E 0.00E 0.00E 8.99E raw mate hergy ress terials; P nary ener idary fuel	-1 1 -2 +1 +1 +1 +0 +0 -6 - 	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of res; SM = Use Use of net fresh	
PERI PERI PERR PENR PENR SM RSF NRSS FW Caption	E [ M [ T [ RE [ RE ] RT ] F [ F ] F [ renew n rene of se ULTS inyl v eter [	MJ MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable pr on-rene wable pr on-rene wable pr on-rene	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 5.63E Use of re imary en wable pri rimary en wable pri rimary en waterial	3 +0 +0 +0 +1 +1 +1 +1 +1 -2 +0 +0 +0 -2 imary en ergy resimary en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy en ergy	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 2E+0 7E-2 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 5E-5 7 energy used as renewab FLOW textile	A constraint of the second sec	A5 41E-1 .35E-1 02E-3 10E+0 10E+0 31E-2 00E+0 00E+0 00E+0 00E+0 47E-5 mg renew erials; P wable p terials; P wable p terials; P wable p terials; P wable p terials; P adary fue	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 1.368E-6 mary environment otal use nergy re Total use Total use nergy re Total use Nergy re Tot	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 ources us wable prin used as n-renewable	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E 1.25E 3.75E 0.00E 0.00E 0.00E 8.99E raw mate nergy res- terials; P nary ener idary fuel	-1 -1 -2 +1 +1 +1 +1 +0 -6 -1 rials; PE ources; ENRM = gy reso s; FW =	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of ruces; SM = Use Use of non- urces; SM = Use Use of net fresh	
PERI PERI PERI PENI PENI SM SM SM SM Caption Caption <b>RESU</b> 1m <sup>2</sup> v Parame	E [ M [ T ] RE [ RE ] RT ] F [ F ] F [ renew n rene of se ULTS inyl v eter [ D	MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable pr	2.81E 1.21E 1.21E 1.67E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E 5.63E Jse of re imary en wable pri rimary en wable pri rimary en waterial IE LCA vering: A1A 1.23E	3           +0           +0           +0           +0           +1           +1           +1           +1           +1           +1           +1           +1           +2           +0           +0           +2           1; RSF =           - OU           3           -6           -2	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 2E+0 7E-2 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+	S ANI b back	A5 41E-1 .35E-1 02E-3 18E+0 31E-2 00E+0 00E+0 00E+0 47E-5 ng renew erials; P evable p terials; P wable p terials; P mdary fue D WAS ing A5 56E-10	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 3.87E-2 0.00E+0 3.68E-6 mary en- otal use r Total use F = Use r ATEG C2 2.02E-9	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 8.21E-2 1.97E-2 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 4.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 5.65E-5 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 0.00C+0 00	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E 1.29E 1.25E 3.75E 0.00E 0.00E 8.99E raw mate hergy ress terials; P nary ener idary fuel C4 1.57E	-1 -1 -2 +1 +1 +1 +0 +0 -6 erials; PE ources; ENRM : gy reso s; FW =	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of PENRE = Use of Use of non- urces; SM = Use Use of net fresh D -4.07E-11	
PERI PERI PERI PENR PENR SM SM SM SM SM SM Caption Caption 1m <sup>2</sup> v Parame HWD NHW	E [ M [ T [ RE ] RT [ RT ] F [ F ] F [ F ] F [ F ] F [ F ] F ] F [ F ] F ] F ] F ] F ] F ] F ] F ] F ] F ]	MJ MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable pr on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene	2.81E 1.21E 4.02E 1.67E 1.47E 3.14F 2.62E 0.00E 5.63E 0.00E 5.63E Jse of re imary en wable pri mary en	3           +0           +0           +0           +0           +1           +1           +1           +1           +1           +1           +1           +1           +2           +0           +0           +2           imary energy respectively respectiv	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 1E+0 7E-2 2E+0 1E+0 1E+0 1E+0 1E+0 0E+0 0E+0 0E+0 0		A5 41E-1 .35E-1 02E-3 18E+0 00E+0 00E+0 00E+0 00E+0 47E-5 mg renew erials; P dary fue bwable p terials; P dary fue <b>D</b> WAS ing <b>A5</b> 56E-10 44E-2	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 3.68E-6 mary en- otal use r ATEG C2 2.02E-9 3.07E-6	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 8.21E-2 1.97E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0urces us wable prin used as n-renewable c3 1.01E-10 5.23E-3	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E 1.29E 3.75E 0.00E 0.00E 0.00E 8.99E raw mate tergy res terials; P nary ener dary fuel C4 1.57E	-1 -1 -2 +1 +1 +1 +1 +0 +0 -6 -6 -7 ENRM -8 gy reso s; FW =	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of Ise of non- urces; SM = Use Use of net fresh D -4.07E-11 -6.37E-5	
PERI PERN PENR PENR PENR SM SSF NRSI FW Caption <b>RESU</b> 1m <sup>2</sup> v <b>Parame</b> HWD NHW RWD	E [ M [ T [ RE [ RE ] RT [ RE ] F [ F [ F ] F [ F ] F ] F [ F ] F ] F ] F ] F ] F ] F ] F ] F ] F ]	MJ MJ MJ MJ MJ MJ MJ MJ MJ ERE = I wable pr on-rene wable pr on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-rene on-ren	2.81E 1.21E 4.02E 1.67E 1.47E 2.62E 0.00E 0.00E 5.63E Jse of re imary en wable pri imary er material IE LCA vering A1-A 1.23E 4.26E 7.77E	3           +0           +0           +0           +1           +1           +1           +1           +2           +0           -2           +0           -2           imary energy responses           imary energy responses           -OU           son v           3           -6           -2           -4	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 2.44 e primary sources to bergy ext sources to thergy ext sourc	4 7E-2 E+0 7E-2 2E+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 D	6. 6. 6. 2. -2. 8. 0.1 0.1 0.1 1. excludir raw mat bon-rene raw mat ble secor /S ANI back 6. 6. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	A5 41E-1 .35E-1 02E-3 18E+0 00E+0 00E+0 00E+0 00E+0 47E-5 00E+0 00E+0 47E-5 00E+0 00E+0 47E-5 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+0 00E+	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 0urces us wable prin used as n-renewal enewable C3 1.01E-10 5.23E-3 7.94E-7	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E 1.29E 3.75E 0.00E 0.00E 0.00E 8.99E raw mate nergy res- terials; P nary ener dary fuel C4 1.57E 3.79E 5.66E	-1 -1 -2 +1 +1 +1 +0 -6 entrials; PE ources; ENRM gy reso s; FW = -9 -1 -6 +0 -6 +0 -1 -1 -1 -1 -2 -2 -2 -2 -2 -2 -2 -2 -2 -2	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 ERM = Use of PENRE = Use of PENRE = Use of Ise of non- urces; SM = Use Use of net fresh D -4.07E-11 -6.37E-5 -1.38E-5	
PERI PERN PENR PENR PENR PENR SM RSF WW Caption 1m <sup>2</sup> v Parame HWW NHW RWE CRU	E [ M [ T [ RE ] RE ] RE [ F [ renew of se ULTS [ inyl v eter [ D ] D ] R	MJ           Wable proon-rene           wable procondary           OF           Vallco           Vallco           Vallco           MJ           MJ           MJ           MJ           MJ           MJ           MJ	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 0.00E 5.63E Jse of re imary en wable pri imary en vering 4.26E 7.77F 0.00E	3           +0           +0           +0           +1           +1           +1           +1           +1           +2           +0           -2           imary erestimary	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 2.44 e primary sources to tergy exists sources to tergy exists Use of it TPUT Voven A 1.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 DE+0 7E+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+0 DE+	6. 6. 6. 2. -2. 8. 0.1 0.1 0.1 0.1 1. excludir raw mat pon-rene raw mat pon-rene raw mat pon-sene raw mat pon-sene raw mat pon-sene raw mat pon-sene raw mat pon-sene (S ANI (S ANI	A5 41E-1 .35E-1 02E-3 02E-3 00E+0 10E+0 31E-2 00E+0 00E+0 47E-5 ng renew erials; P wable p terials; P wable p terials; P modary fue D WAS ing A5 56E-10 44E-2 21E-6 50E-2	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 C2 2.02E-9 3.07E-6 8.01E-8 0.00E+0	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 1.97E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 ources us wable prin used as n-renewable c3 1.01E-10 5.23E-3 7.94E-7 0.00E+0	e e e e e e e e e e e e e e e e e e e	C4 5.27E 4.99E 2.78E 1.29E -1.25E 3.75E 0.00E 8.99E raw mate hergy res- terials; P nary ener iddary fuel C4 1.57E 3.79E 5.66E 0.00E	-1 -1 -2 +1 +1 +1 +0 -6 e gy reso s; FW = -9 -1 -6 +0 +0 -6 +0 +0 -6 +0 +0 -6 +0 +0 +0 -6 +0 +0 -6 +0 +0 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of PURE = Use of urces; SM = Use Use of net fresh D -4.07E-11 -6.37E-5 -1.33E-5 0.00E+0	
PERI PERI PERI PENR PENR SM RSF NRSI FW Caption <b>RESU</b> 1m <sup>2</sup> v <b>Parame</b> HWE NHW RWE CRU	E [ M [ T ] RE [ RE ] RT ] F	MJ           Wable pr           condary           OF           Vallco           Vallco           Mg           kg           kg	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 5.63E Jse of re imary en wable pri- imary en rimary en r material IE LCA vering: A1-A 1.23E 4.26E 7.77E 0.00E 2.86E	3       +0       +0       +0       +0       +1       +1       +1       +1       +1       +1       +2       mewable       ergy resimary er       ergy resimary er       ergy resimary er       son v       3       -6       -2       -4       +0	A 1.27 0.00 1.27 1.32 0.00 0.00 0.00 0.00 0.00 2.44 e primary sources i: Use of ri- TPUT Voven 1.00 2.41 1.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 2E+0 7E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E-5 7 energy used as renewab FLOW textile 4 4 4 4 4 4 4 5 2 5 6 6 7 8 1 1 1 1 1 1 1 1 1 1 1 1 1	6. 6. 6. 7. 7. 8. 0.1 0.1 0.1 1. excludir raw mathematical and the second (S ANI S ANI	A5 41E-1 33E-1 02E-3 10E+0 10E+0 31E-2 00E+0 00E+0 47E-5 ng renew erials; P wable p terials; P wable p terials; P wable p terials; P wable p terials; P <b>b</b> <b>b</b> <b>b</b> <b>c</b> <b>c</b> <b>c</b> <b>c</b> <b>c</b> <b>c</b> <b>c</b> <b>c</b>	able pri ERT = T imary e ENRT = Is; NRS wate	C2 1.99E-3 0.00E+0 1.99E-3 3.87E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 C2 2.02E-9 3.07E-6 8.01E-8 8.01E-8 8.01E-8 8.01E-8 8.01E-8 0.00E+0 0.00E+0	ergy res of rene sources se of no-	C3 7.69E-2 -7.41E-2 2.88E-3 1.02E-1 -8.21E-2 0.00E+0 0.00E+0 0.00E+0 0.00E+0 0.00E+0 4.65E-5 ources us wable prin used as n-renewa renewable C3 1.01E-10 5.23E-3 7.94E-7 0.00E+0 0.00E+0 0.00E+0	sed as i mary er raw ma ble prin e secon	C4 5.27E 4.99E 2.78E 7.27E 1.29E 1.29E 1.25E 3.75E 0.00E 0.00E 0.00E aw mate bergy res terials; P hary ener idary fuel C4 1.57E 3.79E 5.66E 0.00E 0.00E 0.00E	-1 -1 -2 +1 +1 +1 +1 +0 -6 -1 -6 -9 -9 -1 -6 +0 +0 +0 -6 -9 -9 -1 -6 +0 +0 +0 -6 -1 -1 -1 -1 -1 -1 -1 -1 -1 -1	-3.03E-2 0.00E+0 -3.03E-2 -1.29E-1 0.00E+0 -1.29E-1 0.00E+0 0.00E+0 0.00E+0 -4.32E-5 ERM = Use of PENRE = Use of PENRE = Use of PENRE = Use of urces; SM = Use Use of net fresh D -4.07E-11 -6.37E-5 -1.38E-5 0.00E+0 0.00E+0 0.00E+0	
PERI PERI PERI PENR PENR PENR SM RSF NRSS FW Caption 1m <sup>2</sup> v Parame HWD NHW RVD CAPTON NHW RWD CAPTON	E [ M [ T ] RE [ RE ] F	MJ           Kg           Vallco           Jnit           Kg           Kg           Kg           Kg	2.81E 1.21E 4.02E 1.67E 1.47E 3.14E 2.62E 0.00E 5.63E Jse of re imary en wable pri rimary en vaterial <b>IE LCA</b> <b>Vering</b> <b>A1-A</b> 1.23E 4.26E 7.77E 0.00E 2.86E 0.00E	<b>3</b> +0 +0 +0 +1 +1 +1 +1 -2 +0 +0 -2 mary en ergy resimary en ergy en er	A 1.27 0.00 1.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	4 7E-2 2E+0 7E-2 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+0 2E+	6.           6.           6.           2.           2.           8.           0.1           0.1           1.           excluding           raw math           non-rene           raw math           back           6.5           6.6           1.           1.           0.1           0.1	A5 41E-1 .35E-1 02E-3 02E-3 18E+0 .10E+0 31E-2 00E+0 00E+0 00E+0 00E+0 00E+0 47E-5 mg renew erials; 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thermal energy



# 6. LCA: Interpretation



The production stage (module A1-A3) clearly dominates all impact categories. The loads caused by the disposal stage (modules C3 and C4) and transports play a subordinate yet not insignificant role. The main environmental impacts are in all categories located in module A1-A3 and there mostly in the production of PVC and woven cotton. In most impact categories, PVC including plasticizers has the greatest influence while cotton is second place. This is the case for the global warming potential (**GWP**), ozone depletion potential (**ODP**), the depletion of fossil resources (**ADPE**) and the photochemical ozone creation potential (**POCP**).

The depletion of fossil fuels (**ADPF**) is also dominated by the PVC whereas the woven cotton plays a minor role and is primarily responsible for the acidification potential (**AP**) and the eutrophication potential (**EP**) instead.

However, also the thermal and electric energy demand in A3 have a noticeable effect on most impact categories.

# 7. Requisite evidence

Members of the The Global Wallcoverings Association have the following certificates:

- The declared products comply with /EN 15102/.
- According to the (emission) test chamber assessment, which follows the French measurement method /Arrêté du 19/04/11/ the wallcoverings meet the requirements of the test standard /ISO 16000/.
- Optional according to the chamber test which follows the german AgBB (Committee for health-related evaluation of building products)

Transport processes do also affect GWP, AP, EP POCP and ADPF. The main reason is the combustion fuels.

The waste treatment is above all the disposal in module C4 but a smaller fraction is also incinerated. The impact on all categories is relatively small and in general dominated by plastics (PVC) on landfill.

# Range of the results

The individual results of the participating companies differ from the average results in the present environmental product declaration. In terms of GWP, the results may be 82% higher or 24% lower than the average for this EPD.

The main reason for the deviations are differences in the grammage of the individual wallcoverings. In addition, there are different materials used as well as varying heat and electricity consumptions depending on the manufacturer.

regulations the wallcoverings meet the requirements of test standard /ISO 16000/.

- Optional compliance with German /RAL-GZ 479/.
- Optional compliance with USA Wallcovering Association W-101 (2013) paragraph 8.1 when tested by California Specification Section 01350 to criteria /CDPH/EHLB/ Standard Method V1.1 (2010).

The certificates and classifications for the various wallcoverings can be obtained from the respective manufacturers.



# 8. References

### ASTM E 84

ASTM E 84:2016: Standard Test Method for Surface Burning Characteristics of Building Materials

### **ASTM F 793**

ASTM F793 / F793M-15, Standard Classification of Wall Coverings by Use Characteristics, ASTM International, West Conshohocken, PA, 2015

### ASTM F1141 - 93

ASTM F1141-93(2009), Standard Specification for Wallcovering, ASTM International, West Conshohocken, PA, 2009

### BNB

Lifetimes of components for life cycle analyses according to the Bewertungssystem Nachhaltiges Bauen, 2011.

# CDPH/EHLB

Standard method for measuring and evaluating chemical emissions from indoor sources using environmental chambers, Version 1.1

### CPR

**Construction Product Regulation EU** 

#### EN 12149:1997

Wallcoverings in roll form - Determination of migration of heavy metals and certain other elements, of vinyl chloride monomer and of formaldehyde release.

#### EN 12956:1999

Wallcoverings in roll form - Determination of dimensions, straightness, spongeability and washability.

#### EN 13501-1:2007+A1:2009

Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests.

#### EN 15102:2007+A1:2011

Decorative wall coverings - Roll and panel form.

#### EN 233:2016

Wallcoverings in roll form - Specification for finished wallpapers, wall vinyls and plastics wallcoverings.

# EN 234:1997

Wallcoverings in roll form – Specification for wallcoverings for subsequent decoration.

#### EN 235:2001

Wall coverings - Vocabulary and Symbols.

#### EN 259-1:2001

Wall coverings in roll form - Heavy duty wallcoverings - Part 1: Specifications.

#### EN ISO 105-B02:2014

Textiles - Tests for colour fastness - Part B02: Colour fastness to artificial light: Xenon arc fading lamp test.

#### EN ISO 14025:2006

Environmental labels and declarations - Type III

environmental declarations — Principles and procedures; 2009-11.

#### EN ISO 14044:2006

Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044:2006).

#### EN ISO 16000:2006

Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air - Active sampling method. Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA® sorbent, thermal desorption and gas chromatography using MS or MS-FID. Indoor air - Part 9: Determination of the emission of volatile organic compounds from building products and furnishing - Emission test chamber method. Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing - Sampling, storage of samples and preparation of test specimens.

### Ecoinvent

Database for Life Cycle Assessment, version 2.2. Swiss Center for Life Cycle Inventories, St. Gallen, 2010.

### **European Waste Catalogue (EWC)**

European Waste Catalogue / Ordinance on European List of Wastes

#### GaBi

GaBi 7.3: Software and Database for Comprehensive Accounting, LBP [Chair for Construction Physics] Universität Stuttgart and thinkstep AG, Leinfelden-Echterdingen, 1992 - 2015.

#### Institut Bauen und Umwelt e. V.

Product Category Rules for Building-Related Products and Services - Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. 2016-08.

#### Institut Bauen und Umwelt e. V.

PCR Guidance-Texts for Building-Related Products and Services - Part B: Requirements on the EPD for Wallcoverings. 2016-09

#### ISO 14001:2015

Environmental management systems - Requirements with guidance for use (ISO 14001:2015).

#### ISO 50001:2011

Energy management systems - Requirements with guidance for use (ISO 50001:2011).

# **RAL-GZ 479**

Wallpapers - Quality assurance

# WA-101

WA Quality Standard for Polymer Coated Fabric Wallcovering

# Institut Bauen und Umwelt

Institut Bauen und Umwelt e.V., Berlin (pub.):



Generation of Environmental Product Declarations (EPDs); General Principles for the EPD range of Institut Bauen und Umwelt e.V. (IBU), 2015/10 www.ibu-epd.de

# /ISO 14025/

DIN EN /ISO 14025:2011-10/, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

### /EN 15804/

/EN 15804:2012-04+A1 2013/, Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction products

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